TETRA TECH

Sean Kane
Project Manager

June 24, 2014

Mr. Brian Kelly
On-Scene Coordinator
U.S. Environmental Protection Agency Region 5
9311 Groh Road
Grosse Ile, MI 48138

Subject: **Report for the Commonwealth Site Assessment**
EPA Contract No. EP-S5-13-01
Technical Direction Document No. S05-0001-1405-007
Document Tracking No. 0017

Dear Mr. Kelly:

Tetra Tech, Inc. (Tetra Tech) is submitting this Site Assessment Report for the site assessment activities conducted at the Commonwealth site on May 15, 2014. This report summarizes the findings of field activities conducted based on the Abbreviated Sampling and Analysis Plan for the site; specifically, sampling activities performed at 5923 Commonwealth Street, in Detroit, Michigan.

If you have any questions regarding this report, please contact me at (313) 404-3225 and/or Sean.Kane@TetraTech.com.

Respectfully,

Sean Kane

Sean Kane
Project Manager

Enclosure
cc: Sam Chummar, EPA Project Officer (letter only)
Kevin Scott, Tetra Tech Program Manager TDD
File

Tetra Tech, Inc.
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SITE ASSESSMENT REPORT
FOR THE
COMMONWEALTH SITE
5923 COMMONWEALTH,
DETROIT, WAYNE COUNTY, MICHIGAN

U.S. Environmental Protection Agency
Emergency Response Branch
Region 5
9311 Groh Road
Grosse Ile, MI 48138

Submitted by

Tetra Tech Inc.
1 South Wacker Drive, 37th Floor
Chicago, IL 60606

EPA Contract No. EP-S5-13-01

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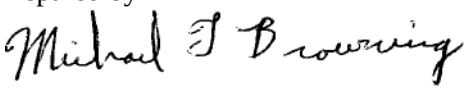
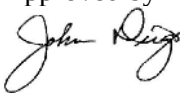
June 24, 2014

Prepared by



Michael T. Browning
Environmental Scientist

Approved by



John Dirgo
Environmental Scientist
START QC Reviewer

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1.0 INTRODUCTION

Under the Superfund Technical Assessment and Response Team (START) Contract No. EP-S5-13-01, Technical Direction Document (TDD) No. S05-0001-1405-007, the U.S. Environmental Protection Agency (EPA) tasked Tetra Tech, Inc. (Tetra Tech), to assist the EPA On-Scene Coordinator (OSC) in performing a site assessment at the Commonwealth site in Detroit, Wayne County, Michigan. EPA requested that Tetra Tech collect three drum samples and two floor samples at the site. The purpose of the sampling was to determine the presence of hazardous substances in the site building. Tetra Tech START also collected written and photographic documentation of the site conditions, performed air monitoring, and evaluated the potential for imminent and substantial threats to the public health and welfare or the environment. Under the direction of OSC Jon Gulch, Tetra Tech START conducted the site assessment on May 15, 2014.

This site assessment report is organized into the following sections:

- **Introduction** – Provides a brief description of the objectives and scope of site assessment activities
- **Site Background** – Details the site description and history
- **Site Assessment Activities** – Discusses the methods and procedures used during the site assessment
- **Analytical Results** – Discusses the analytical results for the samples collected during the site assessment
- **Threats to Human Health and the Environment** – Identifies the conditions at the site that warrant a removal action under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)
- **Conclusions and Recommendation** – Provides a summary of the site assessment findings and Tetra Tech's recommendations based on those findings

In addition, this site assessment report contains three appendices. Appendix A includes site figures, including site location, layout, and sampling location and analytical results map. Appendix B provides the photographic documentation log of site conditions during the site assessment. Appendix C provides a summary of analytical results, the data verification report, and the laboratory analytical report for samples collected during the site assessment.

2.0 SITE BACKGROUND

The site is located at 5923 Commonwealth Street in Detroit, Wayne County, Michigan (Appendix A, Figure 1). The geographic coordinates of the site are 42°21'38.75" North latitude and 83°05'07.10" West longitude. The site is located in a mixed industrial and residential area and is bordered by Avery Street to the west, Marquette Avenue to the north, Trumball Street to the east, and railroad tracks to the south (Appendix A, Figures 1 and 2). Residences are located approximately 125 feet northwest of the site.

The site contains a one-story building occupying a total of 57,864 square feet. ELM Industries, a company that began operations at the site in 1987, used the site for publishing services. The site is no longer operational, and no other information is available regarding the site history.

3.0 FIELD INVESTIGATION

Tetra Tech performed a site assessment in May 2014. Field investigation activities included a site reconnaissance, container inventory, drum sampling, and floor sampling. During these activities, Tetra Tech START conducted air monitoring using a RAE Systems MultiRAE Pro multi-gas air monitor to assess the air in the breathing zone for carbon monoxide, hydrogen sulfide, lower explosive limit, oxygen, and volatile organic compounds (VOC). All ambient air-monitoring readings were at or below background levels. Tetra Tech START also used a Ludlum Model 19 Micro-R Meter to monitor for radioactive materials at the site, and no such materials were identified.

The following sections discuss the site reconnaissance, site observations documented during the investigation, and sampling conducted during the site assessment.

3.1 Site Reconnaissance

On May 15, 2014, the EPA OSC and Tetra Tech START mobilized to the site. After a brief safety meeting and equipment setup, EPA and Tetra Tech START personnel conducted a site reconnaissance to perform air monitoring and identify containers and sampling locations. During the site reconnaissance, written and photographic documentation of current site conditions were collected and potential environmental threats and sampling locations were noted. Appendix B provides photographic documentation of site conditions at the time of the site reconnaissance.

3.2 Site Observations

During the site assessment, the site was non-operational, vacant, and had limited perimeter fencing. Chemicals and some equipment associated with previous site operations were still present. The building contained numerous opened and closed totes, drums, compressed gas cylinders, and small containers with no secondary containment. Several of the on-site containers showed signs of deterioration caused by water that had leaked in through the building's damaged roof. Deteriorated containers were observed near floor drains in several areas throughout the building in which releases of waste were noted.

Tetra Tech START and EPA inventoried the totes, drums, compressed gas cylinders, and small containers to determine the approximate quantity of containers and waste located at the site.

During the inventory, EPA and Tetra Tech START identified 11 poly totes; approximately 60 steel, fiber, and poly 55-gallon drums; approximately 20 compressed gas cylinders; and approximately 170 small containers with a capacity of 5 or fewer gallons. Labels on some containers and drums indicated the potential presence of biological waste, trichloroethylene, acetylene gas, hydraulic and motor oil, coating enamels, propylene glycol n-propyl ether, and hydrogen peroxide.

3.3 Sampling

In accordance with the site-specific field sampling plan and health and safety plan, Tetra Tech START collected three liquid drum samples and two liquid floor samples for laboratory analysis (Appendix A, Figure 3). The drum samples were collected in Level B personal protective equipment (PPE), while the floor samples were collected in Level D PPE. All samples were placed into glass sample jars provided by the laboratory, labeled appropriately, and placed on ice. The sample identification numbers and descriptions are as follows:

- **CW-DR-01-051514** – Liquid sample collected from a 55-gallon drum that exhibited a VOC reading of approximately 1,000 parts per million (ppm)
- **CW-DR-02-051514** – Liquid sample collected from a 55-gallon drum that exhibited a VOC reading of approximately 475 ppm
- **CW-DR-03-051514** – Liquid sample collected from a 55-gallon drum
- **CW-FL-01-051514** – Liquid sample collected from the floor of the main room
- **CW-FL-02-051514** – Liquid sample collected from the floor of the main room

Samples CW-DR-01-051514 and CW-DR-02-051514 were analyzed for toxicity characteristic leaching procedure (TCLP) VOCs using EPA Method SW8260B; TCLP semivolatile organic compounds (SVOC)

using EPA Method SW8270D; pH using EPA Method SW9045D; and flashpoint/ignitibility using EPA Method SW1010. Sample CW-DR-03-051514 was analyzed for TCLP metals using EPA Method SW6010C, TCLP mercury using EPA Method SW7470A, flashpoint/ignitibility, and total polychlorinated biphenyls (PCB). Samples CW-FL-01-051514 and CW-FL-02-051514 were analyzed for total PCBs.

After the sampling event on May 15, 2014, all samples were maintained in a cooler on ice and in possession of Tetra Tech START, and on May 16, 2014, Tetra Tech START hand-delivered all five samples to RTI Laboratories, Inc., in Livonia, Michigan, for laboratory analysis.

4.0 ANALYTICAL RESULTS

The analytical results for each of the five liquid samples collected during the site assessment are presented in Appendix C, along with the data verification report associated with the samples. The analytical results were compared to the hazardous waste identification criteria presented in Title 40 of the *Code of Federal Regulations* (CFR), Part 261. According to 40 CFR, Part 261.2, a substance is considered a hazardous waste if it exhibits any of the characteristics of ignitability, corrosivity, toxicity, or reactivity. Detected analytical results for the samples are summarized below.

In the case of PCBs, the analytical result was compared to the Michigan Department of Environmental Quality (MDEQ) Part 201 General Cleanup Criteria and Screening Levels for Direct Contact in non-residential areas (dated December 30, 2013).

Each of the parameters analyzed in the samples collected during the May 2014 site assessment is listed below, with a summary of the results for each sample collected.

TCLP SVOC Results

- No TCLP SVOCs were detected in any of the samples.

TCLP VOC Results

- Tetrachloroethene was detected in sample CW-DR-01-051514 at a concentration of 1,100 micrograms per liter (j.tg/L) (1.1 milligrams per liter [mg/L]). This result exceeds the toxicity criterion for tetrachloroethene of 0.7 mg/L. Therefore, the waste associated with this sample is considered hazardous according to 40 CFR 261.24.
- Methyl ethyl ketone was detected in sample CW-DR-02-051514 at a concentration of 22,000 j.tg/L (22.0 mg/L). This result is less than the toxicity criterion for methyl ethyl ketone of 200.0 mg/L.

Therefore, the waste associated with this sample is not considered hazardous according to 40 CFR 261.24.

Flashpoint/Ignitibility Results

- The flashpoints of samples CW-DR-01-051514 and CW-DR-02-051514 were 72 and 70 degrees Fahrenheit (°F), respectively. These results are less than 140 °F. Therefore, the wastes associated with these two samples are considered hazardous for the characteristic of ignitibility according to 40 CFR 261.21. The flashpoint of a third sample (CW-DR-03-051514) was above 200 °F, and this sample is not considered hazardous for ignitibility.

Corrosivity Results

- The pH of Samples CW-DR-01-051514 and CW-DR-02-051514 were 6.84 and 4.97 standard units (SU), respectively. Therefore, the wastes associated with these samples are not considered hazardous for the characteristic of corrosivity, according to 40 CFR 261.22.

Polychlorinated Biphenyl Results

- PCBs were detected in samples CW-FL-01-051514 and CW-FL-02-051514 at concentrations of 280 micrograms per kilogram (µg/kg) (0.28 milligrams per kilogram [mg/kg]) and 91 µg/kg (0.091 mg/kg), respectively. These results are less than the criterion for PCBs of 4.8 mg/kg, as stated in the MDEQ Part 201 General Cleanup Criteria and Screening Levels for Direct Contact in nonresidential areas (dated December 30, 2013).

TCLP Metal Results

- Arsenic, barium, cadmium, chromium, and silver were detected in Sample CW-DR-03-051514 at concentrations of 17 µg/L (0.017 mg/L), 1,600 µg/L (1.6 mg/L), 0.86 µg/L (0.00086 mg/L), 10.0 µg/L (0.01 mg/L), and 0.67 µg/L (0.00067 mg/L), respectively. These results are less than the toxicity criterion for arsenic, barium, cadmium, chromium, and silver of 5.0 mg/L, 100 mg/L, 1.0 mg/L, 5.0 mg/L, and 5.0 mg/L, respectively. In addition, similar concentrations of all of these metals except barium were found in the laboratory method blank; only barium was detected in the sample at a concentration much higher than the blank. Therefore, the waste associated with this sample is not considered hazardous according to 40 CFR 261.24.

5.0 THREATS TO HUMAN HEALTH AND THE ENVIRONMENT

Factors to be considered in determining the appropriateness of a potential removal action at a site are delineated in the NCP at 40 CFR, Part 300.415(b)(2). Threat factors that may be applicable to the site are summarized below:

- **Actual or potential exposure of nearby human populations, animals, or the food chain to hazardous substances or pollutants or contaminants**

  Residences are located approximately 125 feet northwest of site building. The presence of the residences increases the likelihood of exposure to residents of a release of hazardous substances at the site. During the site assessment, the building contained totes, drums, compressed gas cylinders, and small containers with no secondary containment. Two of the five samples collected during the site assessment contained characteristically hazardous wastes.

- **Actual or potential contamination of drinking water supplies or sensitive ecosystems**

  The presence of totes, drums, compressed gas cylinders, and small containers with no secondary containment in the site building could result in the release of hazardous wastes into nearby storm sewer catch basins. Releases could also potentially flow unimpeded into the floor drains of the building. Pollutants that enter bodies of water can be retained for long periods of time and can negatively impact sensitive ecosystems.

- **Hazardous substances or pollutants or contaminants in totes, drums, compressed gas cylinders, and small containers that may pose a threat of release**

  During the site assessment, EPA and Tetra Tech START observed numerous compromised and opened totes, drums, compressed gas cylinders, and small containers in the site building. During the site assessment, the site was non-operational and vacant but chemicals were still present. Several of the on-site containers showed signs of deterioration caused by water that had leaked in through the building's roof.

  Several areas in the building had floor drains near deteriorated containers. Additionally, releases of liquid materials were observed within several areas of the building. Two of the five samples collected during the site assessment contained characteristically hazardous wastes.

The unrestricted site access could result in trespassers causing accidental or intentional releases of chemicals stored in on-site containers or chemical reactions that could result in the release of toxic gases.

- **Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released**

  The site is no longer occupied and is no longer maintained. Therefore, the building likely will continue to deteriorate. Holes in the roof were observed at several locations throughout the building. These holes will continue to allow snow, rain, and other precipitation as well as birds and other wildlife to access the interior of the building. Precipitation that enters the building can overfill open totes and other containers and release their contents, as well as wash existing spills throughout the building and beyond through floor drains and other migration routes.

- **Threat of fire or explosion**

  The threat of fire or explosion at the site is high based on the flammable nature of some of the wastes located at the site, and because the site building is unoccupied and unsecured. During the site assessment, two samples exhibited the characteristic of ignitibility. The probability for an intentional fire being set at a vacant facility will increase over time. In addition, the storage of potentially incompatible chemicals without secondary containment could result in an unintentional fire caused by the interaction of the contents of deteriorating containers.

6.0 CONCLUSION AND RECOMMENDATIONS

Tetra Tech START collected five liquid samples during the site assessment. Analytical results were compared to the criteria set forth in 40 CFR Part 261 and to MDEQ Part 201 General Cleanup Criteria and Screening Levels for Direct Contact in non-residential areas (dated December 30, 2013) to determine whether wastes stored at the site are considered hazardous. Analytical results for two of the five samples indicated the presence of characteristically hazardous wastes at the site.

The hazards and threats summarized below also were identified during the site assessment:

- The site building contained totes, drums, compressed gas cylinders, and small containers of various contents in varying states of deterioration, all without secondary containment.

- The site is bordered along the west by residential properties, thus increasing the likelihood of an adverse impact on nearby residents.
- The on-site building has deteriorated and precipitation is leaking through the roof at several locations. The continued deterioration of the building increases the chance of further degradation of the containers, the likelihood of a fire, and the likelihood of a release to the environment.

APPENDIX A
FIGURES

1 – SITE LOCATION MAP
2 – SITE LAYOUT MAP
3 – SAMPLING LOCATION & ANALYTICAL RESULTS MAP

Site Location

DETROIT

Legend

Approximate Property Boundary

N

0 1,000 2,000 Feet

COMMONWEALTH SITE
5923 COMMONWEALTH STREET
DETROIT, WAYNE COUNTY, MICHIGAN

FIGURE 1
SITE LOCATION MAP

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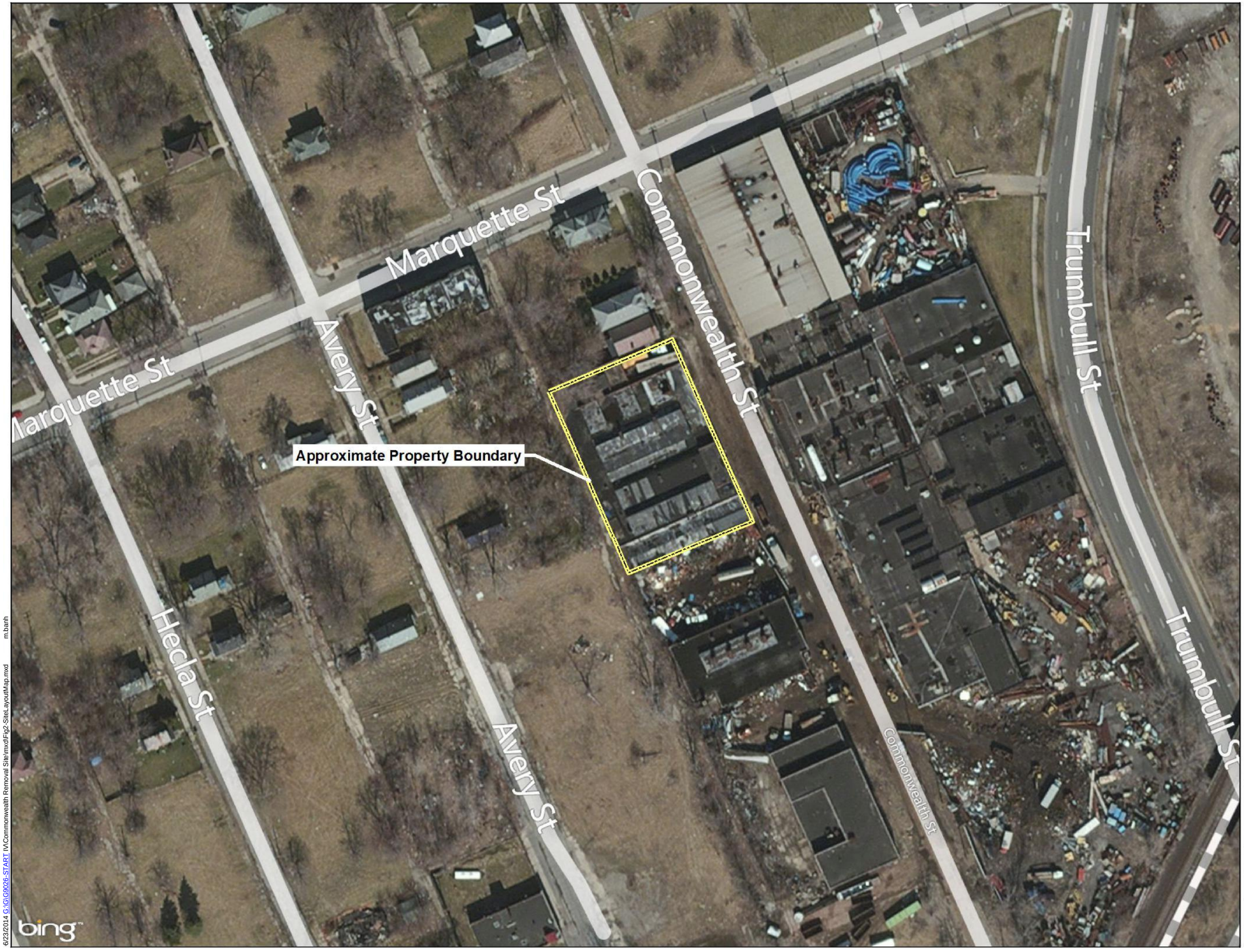

N

0 100 200 Feet

COMMONWEALTH SITE
5923 COMMONWEALTH STREET
DETROIT, WAYNE COUNTY, MICHIGAN

FIGURE 2
SITE LAYOUT MAP

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CW-DR-03-051514	
Ignitability	>200 deg.F
Arsenic	17 g/L
Barium	1,600 g/L
Cadmium	0.86 g/L
Chromium	10 g/L
Silver	0.67 g/L

CW-DR-02-051514	
Methyl ethyl ketone	22,000 µg/L
Ignitability	70 deg.F
Corrosivity (pH)	4.97 S.U.

CW-FL-02-051514	
Aroclor 1260	91 g/kg

CW-DR-01-05154	
Tetrachloroethene	1,100 g/L
Ignitability	72 deg.F
Corrosivity (pH)	6.84 S.U

CW-FL-01-051514	
Aroclor 1016	220 g/kg
Aroclor 1260	61 g/kg

bing™

Legend

- Sampling Location
- Approximate Property Boundary
- Concentration exceeds hazardous characteristic of ignitability according to 40 CFR 261.21
- Concentration exceeds toxicity criterion according to 40 CFR 261.24

Notes:
ug/L = micrograms per liter
ug/kg = micrograms per kilogram S.U. = Standard Units
deg. F = Degrees Fahrenheit

N

0 10 20 Feet

COMMONWEALTH STREET SITE
5923 COMMONWEALTH STREET
DETROIT, WAYNE COUNTY, MICHIGAN

FIGURE 3
SAMPLE LOCATION AND ANALYTICAL RESULTS MAP

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APPENDIX B

PHOTOGRAPHIC DOCUMENTATION LOG

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 1 **Date: 0**5/15/14* **Time:** 0918 **Description:** Drum storage area	

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 2

Date: 05/15/14*

Time: 0947

Description:
Additional drum and tote storage area and water intrusion.

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 3 **Date:** 05/15/14* **Time:** 1101 **Description:** Damaged building materials	
Photograph No.: 4 **Date:** 05/15/14* **Time:** 1108 **Description:** Waste materials located near a floor drain	

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 5 **Date:** 05/15/14* **Time:** 1047 **Description:** Biohazard waste container	

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 6

Date: 05/15/14*

Time: 1055

Description:
Additional drum labeling

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 7

Date: 05/15/14*

Time: 1039

Description:
Damaged drum

Photograph No.: 8

Date: 05/15/14*

Time: 1022

Description:
START personnel's initial assessment of tote contents

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

Photographic Documentation Log

Client: U.S. Environmental Protection Agency Region 5
Site Name: Commonwealth SA
Location: 5923 Commonwealth Street, Detroit, MI

Prepared By: Tetra Tech, Inc.
Photographer: Sean Kane
TDD: S05-0001-1405-007

Photograph No.: 9

Date: 05/15/14*

Time: 1254

Description:
Drum sampling activities

*The date feature on the camera used to take the photographs in this log was incorrectly set. All photographs were taken on 05/15/14, though the photos themselves are printed (incorrectly) with the date 05/14/14.

APPENDIX C

ANALYTICAL RESULT TABLE AND DATA VERIFICATION REPORT

Commonwealth Site Assessment
Analytical Results
Summary of Detected RCRA and MDEQ Compounds

Parameter	Units	Sample Name	CW-DR-01-05154	CW-DR-02-051514	CW-DR-03-051514
		Sampling Date	05/15/14	05/15/14	05/15/14
		Sample Matrix	Liquid	Liquid	Liquid
		Regulatory Level	**Analytical Result**	**Analytical Result**	**Analytical Result**
TCLP Semivolatile Analysis					
	ug/L	Chemical Specific	Not detected	Not detected	Not analyzed
TCLP Volatile Analysis					
Tetrachloroethene	ug/L	700	1,100	Not detected	Not analyzed
Methyl ethyl ketone	ug/L	200,000	Not detected	22,000	Not analyzed
Inorganic Analysis					
Ignitability	deg. F	<140	72	70	>200
Corrosivity (pH)	S.U.	pH ≤ 2 or ≥ 12.5	6.84	4.97	Not analyzed
Polychlorinated Biphenyls					
Aroclor 1016	ug/kg	4,800	Not analyzed	Not analyzed	Not detected
Aroclor 1221	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1232	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1242	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1248	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1254	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1260	ug/kg		Not analyzed	Not analyzed	Not detected
Aroclor 1262	ug/kg		Not analyzed	Not analyzed	Not detected
Total	ug/kg		Not analyzed	Not analyzed	Not detected
TCLP Metals Analysis					
Arsenic	ug/L	5,000	Not analyzed	Not analyzed	17
Barium	ug/L	100,000	Not analyzed	Not analyzed	1,600
Cadmium	ug/L	1,000	Not analyzed	Not analyzed	0.86
Chromium	ug/L	5,000	Not analyzed	Not analyzed	10
Silver	ug/L	5,000	Not analyzed	Not analyzed	0.67
Mercury	ug/L	200	Not analyzed	Not analyzed	Not detected

Notes:
(1) TCLP SVOC, TCLP VOC, Ignitibility, Corrosivity, and TCLP Metals criteria are based on Code of Federal Regulations, Part 40, Section 261, Subsections 20 to 24.
(2) PCB criteria is based on MDEQ Part 201General Cleanup Criteria and Screening Levels for Direct Contact in non-residential area (Dated December 30, 2013).
ug/L = micrograms per liter
ug/kg = micrograms per kilogram
CFR = Code of Federal Regulations, Part 40, Section 261, Subsections 20 to 24
deg. F = Degrees Fahrenheit,
MDEQ = Michigan Department of Environmental Quality
S.U. = Standard Units
SVOC = Semivolatile organic compound
TCLP = Toxicity characteristic leaching procedure
VOC = Volatile organic compound

Commonwealth Site Assessment
Analytical Results
Summary of Detected RCRA and MDEQ Compounds

Parameter	Units	Sample Name	CW-FL-01-051514	CW-FL-02-051514
		Sampling Date	05/15/14	05/15/14
		Sample Matrix	Liquid	Liquid
		Regulatory Level	**Analytical Result**	**Analytical Result**
TCLP Semivolatile Analysis				
	ug/L	Chemical Specific	Not analyzed	Not analyzed
TCLP Volatile Analysis				
	ug/L	Chemical Specific	Not analyzed	Not analyzed
	ug/L	Chemical Specific	Not analyzed	Not analyzed
Inorganic Analysis				
Ignitibility	deg. F	<140	Not analyzed	Not analyzed
Corrosivity (pH)	S.U.	pH ≤ 2 or ≥ 12.5	Not analyzed	Not analyzed
Polychlorinated Biphenyls				
Aroclor 1016	ug/kg	4,800	220	Not detected
Aroclor 1221	ug/kg		Not detected	Not detected
Aroclor 1232	ug/kg		Not detected	Not detected
Aroclor 1242	ug/kg		Not detected	Not detected
Aroclor 1248	ug/kg		Not detected	Not detected
Aroclor 1254	ug/kg		Not detected	Not detected
Aroclor 1260	ug/kg		61	91
Aroclor 1262	ug/kg		Not detected	Not detected
Total	ug/kg		280	91
TCLP Metals Analysis				
Arsenic	ug/L	5,000	Not analyzed	Not analyzed
Barium	ug/L	100,000	Not analyzed	Not analyzed
Cadmium	ug/L	1,000	Not analyzed	Not analyzed
Chromium	ug/L	5,000	Not analyzed	Not analyzed
Silver	ug/L	5,000	Not analyzed	Not analyzed
Mercury	ug/L	200	Not analyzed	Not analyzed

Notes:
(1) TCLP SVOC, TCLP VOC, Ignitibility, Corrosivity, and TCLP Metals criteria are based on Code of Federal Regulations, Part 40, Section 261, Sub-sections 20 to 24.
(2) PCB criteria is based on MDEQ Part 201General Cleanup Criteria and Screening Levels for Direct Contact in non-residential area (Dated December 30, 2013).
ug/L = micrograms per liter
ug/kg = micrograms per kilogram
CFR = Code of Federal Regulations, Part 40, Section 261, Subsections 20 to 24
deg. F = Degrees Fahrenheit,
MDEQ = Michigan Department of Environmental Quality
S.U. = Standard Units
SVOC = Semivolatile organic compound
TCLP = Toxicity characteristic leaching procedure
VOC = Volatile organic compound

DATA VERIFICATION REPORT

Commonwealth Removal Site Assessment, Detroit, Michigan

This report presents a data verification for the analytical report on samples collected from the Commonwealth Removal Site Assessment site in Detroit, Michigan, on 15 May 2014 by Tetra Tech START personnel. These comprised five fluid samples, some of which were multi-phasic, that were hand-carried to RTI Laboratories, Inc. (RTI), in Livonia, Michigan, for various analyses. RTI identified the samples as Work Order No. 1405741 and analyzed them by the requested U.S. Environmental Protection Agency (EPA) SW-846 methods. The following sections discuss each analysis in turn and discuss the results and any apparent problems. The final section provides an overall evaluation of the results. RTI's reported analytical results are included following this report.

1.0 Volatile Organic Compounds

Two samples were analyzed for toxicity characteristic leaching procedure (TCLP) volatile organic compounds (VOC) by EPA SW-846 Method 8260B. TCLP extractions were done using EPA SW-846 Method 1311. One laboratory blank yielded a low concentration of chlorobenzene. No chlorobenzene was detected in the samples, so no qualifications were applied. One set of matrix spike/matrix spike duplicate (MS/MSD) analyses yielded very low recoveries for tetrachloroethene. The sample used for those analyses was from another site and yielded a very high unspiked concentration of the compound. No qualifications were applied to the START samples.

2.0 Semivolatile Organic Compounds

Two samples were analyzed for TCLP semivolatile organic compounds (SVOC) by EPA SW-846 Method 8270C. Sample CW-AR-01-051514 yielded 0 percent recovery for two of three acidic surrogates and less than 1 percent recovery for one of three acid/basic surrogates. These irregularities imply significant matrix interference. Therefore all of the nondetected results in sample CW-AR-01-051514 are qualified as estimated and the reporting limits flagged "UJ" to indicate the problem. RTI analyzed duplicate laboratory control samples (LCS) in lieu of MS/MSD analyses. While all recoveries were within their various quality control (QC) limits, most relative percent differences (RPD) were above their QC limits. No SVOCs were reported in any of the START samples so no qualifications were applied.

3.0 Polychlorinated Biphenyls Analyses

Three samples were analyzed for polychlorinated biphenyls (PCB) by EPA SW-846 Method 8082. Two of those samples yielded significant concentrations of PCBs, which were identified as Aroclor 1016 and 1260. In both samples the second surrogate (decachlorobiphenyl) yielded a recovery above QC limits. This is probably a consequence of interference from the samples' PCB contents, so no qualifications were applied. In addition, no qualifications were applied for the irregularities in the MS/MSD analyses that were performed on a sample from another site.

4.0 Metals Analyses

One sample was analyzed for TCLP metals by EPA SW-846 Methods 6010C and 7470A. The laboratory (method) blank yielded low concentrations of most of the analytes. The similar concentrations of arsenic, cadmium, chromium, and silver in sample CW-AR-03-051514 are qualified as laboratory artifacts and flagged "U" to indicate that. The sample's barium concentration is much higher than the blank, so it is not qualified. No qualifications were applied for the irregularities with barium and selenium in the MS/MSD analyses because they were performed on a sample from another site.

5.0 Other Analyses

Two samples were analyzed for ignitability by EPA SW-846 Method 1010 and for pH by EPA SW-846 Method 9045D. There were no irregularities in either analysis.

6.0 Overall Evaluation

RTI analyzed the samples using the requested analytical methods with no significant problems and with few qualifications applied. Those qualifications were due to minor laboratory irregularities (trace concentrations of some metals) or the nature of the samples themselves (low surrogate recoveries). All results may be used, as qualified, for any purpose.

ATTACHEMENT 1

LABORATORY ANALYTICAL RESULTS

RTI LABORATORIES, INC.

RTI Laboratories 31628
Glendale St. Livonia,
MI 48150 TEL: (734)
422-8000 Website:
www.rtilab.com

Monday, June 02, 2014

Sean Kane
Tetra Tech Inc.
26600 Telegraph Road
Suite 400
Southfield, MI 48034
TEL:
FAX:

RE: Commonwealth SA

Work Order #: 1405741

Dear Sean Kane:

RTI Laboratories received 5 sample(s) on 5/16/2014 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

This report may only be reproduced in its entirety. Individual pages, reproduced without supporting documentation, do not contain related information and may be misinterpreted by other data reviewers.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Fred Hoitash

Fred Hoitash

Director, Sales and Field Services

RTI Laboratories - Workorder Sample Summary

WO#: 1405741

Date Reported: **6/2/2014**
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA

Lab Sample ID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1405741-001A	CW-AR-01-051514		5/15/2014 12:30 PM	5/16/2014 4:00 PM	Liquid
1405741-002A	CW-AR-02-051514		5/15/2014 12:45 PM	5/16/2014 4:00 PM	Liquid
1405741-003A	CW-AR-03-051514		5/15/2014 12:55 PM	5/16/2014 4:00 PM	Liquid
1405741-004A	CW-FL-01-051514		5/15/2014 12:30 PM	5/16/2014 4:00 PM	Liquid
1405741-005A	CW-FL-02-051514		5/15/2014 12:33 PM	5/16/2014 4:00 PM	Liquid

RTI Laboratories - Case Narrative

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA

This report in its entirety consists of the documents listed below. All documents contain the RTI Work Order Number assigned to this report.

1. Paginated Report including: Case Narrative, Analytical Results and Applicable Quality Control Summary Reports.
2. A Cover Letter that immediately precedes the Paginated Report.
3. Paginated copies of the Chain of Custody Documents supplied with this sample set.

Concentrations reported with a J flag in the Qual field are values below the reporting limit (RL) but greater than the established method detection limit (MDL). There is greater uncertainty associated with these results and data should be considered as estimated.

Concentrations reported with an E flag in the Qual field are values that exceed the upper quantification range. There is greater uncertainty associated with these results and data should be considered as estimated.

The EPA has withdrawn the tests for Reactive Cyanide and Reactive Sulfide. There is no guidance nor reference for testing wastes for Cyanide or Sulfide other than for total concentrations. The generator is required to provide a narrative description of the reactivity of the waste according to 40CFR261.23 for the Characteristic of Reactivity.

Any comments or problems with the analytical events associated with this report are noted below.

General
Samples 1405741-001 and 002 are filterable liquids with multiple phases. Portions of each phase were used for sample preparation: Variations in phase use will negatively affect the reproducibilty of duplicate sample and MS/MSD reusukts

Semi Volatile Organic Compounds
Analytical Comments for METHOD SW8270D , SAMPLE 1405741-001A, Batch ID 33214: Surrogate recoveries affected by interference by non target peaks.

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:30:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-001	**Matrix:**	Liquid
Client Sample ID:	CW-AR-01-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
TCLP: SVOCs		**Method: SW8270D**		**SW3510C**		**Analyst: JH1**
Semi-Volatile Organic Compounds						
2,4,5-Trichlorophenol	ND	25		µg/L	1	5/28/2014 12:41 PM
2,4,6-Trichlorophenol	ND	20		µg/L	1	5/28/2014 12:41 PM
2,4-Dinitrotoluene	ND	25		µg/L	1	5/28/2014 12:41 PM
2-Methylphenol	ND	25		µg/L	1	5/28/2014 12:41 PM
3/4 Methylphenol	ND	50		µg/L	1	5/28/2014 12:41 PM
Hexachlorobenzene	ND	5.0		µg/L	1	5/28/2014 12:41 PM
Hexachlorobutadiene	ND	5.0		µg/L	1	5/28/2014 12:41 PM
Hexachloroethane	ND	25		µg/L	1	5/28/2014 12:41 PM
Nitrobenzene	ND	15		µg/L	1	5/28/2014 12:41 PM
Pentachlorophenol	ND	25		µg/L	1	5/28/2014 12:41 PM
Pyridine	ND	50		µg/L	1	5/28/2014 12:41 PM
Surr: 2,4,6-Tribromophenol	94.0	43-140		%REC	1	5/28/2014 12:41 PM
Surr: 2-Fluorobiphenyl	44.7	44-119		%REC	1	5/28/2014 12:41 PM
Surr: 2-Fluorophenol	0	19-119	S	%REC	1	5/28/2014 12:41 PM
Surr: Nitrobenzene-d5	0.200	44-120	S	%REC	1	5/28/2014 12:41 PM
Surr: Phenol-d5	0	30-130	S	%REC	1	5/28/2014 12:41 PM
Surr: Terphenyl-d14	112	50-134		%REC	1	5/28/2014 12:41 PM
TCLP: VOCs		**Method: SW8260B**		**SW1311B**		**Analyst: AS1**
Volatile Organic Compounds						
1,1-Dichloroethene	ND	200		µg/L	200	5/23/2014 2:54 PM
1,2-Dichloroethane	ND	200		µg/L	200	5/23/2014 2:54 PM
1,4-Dichlorobenzene	ND	200		µg/L	200	5/23/2014 2:54 PM
Benzene	ND	200		µg/L	200	5/23/2014 2:54 PM
Carbon tetrachloride	ND	200		µg/L	200	5/23/2014 2:54 PM
Chlorobenzene	ND	200		µg/L	200	5/23/2014 2:54 PM
Chloroform	ND	200		µg/L	200	5/23/2014 2:54 PM
Methyl ethyl ketone	ND	2,000		µg/L	200	5/23/2014 2:54 PM
Tetrachloroethene	1,100	200	*	µg/L	200	5/23/2014 2:54 PM
Trichloroethene	ND	200		µg/L	200	5/23/2014 2:54 PM
Vinyl chloride	ND	200		µg/L	200	5/23/2014 2:54 PM
Surr: 4-Bromofluorobenzene	112	85-114		%REC	200	5/23/2014 2:54 PM
Surr: Dibromofluoromethane	107	80-119		%REC	200	5/23/2014 2:54 PM
Surr: Toluene-d8	111	89-112		%REC	200	5/23/2014 2:54 PM
Ignitability		**Method: SW1010**				**Analyst: JE**
Ignitability	72	70		°F	1	5/27/2014 9:00 AM
Solid pH Measured in Water at Reported Temperature		**Method: SW9045D**				**Analyst: JE**
Hydrogen Ion (pH)	6.84			pH Units	1	5/21/2014 8:00 AM

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:30:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-001	**Matrix:**	Liquid
Client Sample ID:	CW-AR-01-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Temperature	19.8			°C	1	5/21/2014 8:00 AM

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:45:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-002	**Matrix:**	Liquid
Client Sample ID:	CW-AR-02-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
TCLP: SVOCs		**Method: SW8270D**		**SW3510C**		**Analyst: JH1**
Semi-Volatile Organic Compounds						
2,4,5-Trichlorophenol	ND	25		µg/L	1	5/28/2014 1:08 PM
2,4,6-Trichlorophenol	ND	20		µg/L	1	5/28/2014 1:08 PM
2,4-Dinitrotoluene	ND	25		µg/L	1	5/28/2014 1:08 PM
2-Methylphenol	ND	25		µg/L	1	5/28/2014 1:08 PM
3/4 Methylphenol	ND	50		µg/L	1	5/28/2014 1:08 PM
Hexachlorobenzene	ND	5.0		µg/L	1	5/28/2014 1:08 PM
Hexachlorobutadiene	ND	5.0		µg/L	1	5/28/2014 1:08 PM
Hexachloroethane	ND	25		µg/L	1	5/28/2014 1:08 PM
Nitrobenzene	ND	15		µg/L	1	5/28/2014 1:08 PM
Pentachlorophenol	ND	25		µg/L	1	5/28/2014 1:08 PM
Pyridine	ND	50		µg/L	1	5/28/2014 1:08 PM
Surr: 2,4,6-Tribromophenol	122	43-140		%REC	1	5/28/2014 1:08 PM
Surr: 2-Fluorobiphenyl	97.5	44-119		%REC	1	5/28/2014 1:08 PM
Surr: 2-Fluorophenol	88.4	19-119	m	%REC	1	5/28/2014 1:08 PM
Surr: Nitrobenzene-d5	93.6	44-120		%REC	1	5/28/2014 1:08 PM
Surr: Phenol-d5	72.1	30-130		%REC	1	5/28/2014 1:08 PM
Surr: Terphenyl-d14	116	50-134		%REC	1	5/28/2014 1:08 PM
TCLP: VOCs		**Method: SW8260B**				**Analyst: AS1**
Volatile Organic Compounds						
1,1-Dichloroethene	ND	200		µg/L	200	5/22/2014 1:29 PM
1,2-Dichloroethane	ND	200		µg/L	200	5/22/2014 1:29 PM
1,4-Dichlorobenzene	ND	200		µg/L	200	5/22/2014 1:29 PM
Benzene	ND	200		µg/L	200	5/22/2014 1:29 PM
Carbon tetrachloride	ND	200		µg/L	200	5/22/2014 1:29 PM
Chlorobenzene	ND	200		µg/L	200	5/22/2014 1:29 PM
Chloroform	ND	200		µg/L	200	5/22/2014 1:29 PM
Methyl ethyl ketone	22,000	2,000		µg/L	200	5/22/2014 1:29 PM
Tetrachloroethene	ND	200		µg/L	200	5/22/2014 1:29 PM
Trichloroethene	ND	200		µg/L	200	5/22/2014 1:29 PM
Vinyl chloride	ND	200		µg/L	200	5/22/2014 1:29 PM
Surr: 4-Bromofluorobenzene	105	85-114		%REC	200	5/22/2014 1:29 PM
Surr: Dibromofluoromethane	108	80-119		%REC	200	5/22/2014 1:29 PM
Surr: Toluene-d8	111	89-112		%REC	200	5/22/2014 1:29 PM
Ignitability		**Method: SW1010**				**Analyst: JE**
Ignitability	70	70		°F	1	5/27/2014 9:00 AM
Solid pH Measured in Water at Reported Temperature		**Method: SW9045D**				**Analyst: JE**
Hydrogen Ion (pH)	4.97			pH Units	1	5/21/2014 8:00 AM

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:45:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-002	**Matrix:**	Liquid
Client Sample ID:	CW-AR-02-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Temperature	20.0			°C	1	5/21/2014 8:00 AM

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:55:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-003	**Matrix:**	Liquid
Client Sample ID:	CW-AR-03-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Polychlorinated Biphenyls		**Method: SW8082A**				**Analyst: JD1**
Aroclor 1016	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1221	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1232	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1242	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1248	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1254	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1260	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Aroclor 1262	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Total PCBs	ND	0.91		mg/Kg	1	5/23/2014 1:02 PM
Surr: Tetrachloro-m-xylene	88.2	41.1-138		%REC	1	5/23/2014 1:02 PM
Surr: Decachlorobiphenyl	103	36.1-139		%REC	1	5/23/2014 1:02 PM
TCLP: Metals		**Method: SW6010C**		**SW3020A**		**Analyst: MK**
Metals, ICP/OES						
Arsenic	17	40	J	µg/L	1	5/22/2014 10:24 AM
Barium	1,600	200		µg/L	1	5/22/2014 10:24 AM
Cadmium	0.86	5.0	J	µg/L	1	5/22/2014 10:24 AM
Chromium	10	10		µg/L	1	5/22/2014 10:24 AM
Lead	ND	100		µg/L	1	5/22/2014 10:24 AM
Selenium	ND	40		µg/L	1	5/22/2014 10:24 AM
Silver	0.67	20	J	µg/L	1	5/22/2014 10:24 AM
TCLP: Metals		**Method: SW7470A**		**SW7470**		**Analyst: AB2**
Mercury						
Mercury	ND	0.20		µg/L	1	5/22/2014 8:22 AM
Ignitability		**Method: SW1010**				**Analyst: JE**
Ignitability	>200	70		°F	1	5/27/2014 9:00 AM

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:30:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-004	**Matrix:**	Liquid
Client Sample ID:	CW-FL-01-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Polychlorinated Biphenyls		**Method: SW8082A**		**SW3550C**		**Analyst: MB**
Aroclor 1016	220	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1221	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1232	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1242	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1248	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1254	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1260	61	33		µg/Kg	1	5/23/2014 10:59 PM
Aroclor 1262	ND	33		µg/Kg	1	5/23/2014 10:59 PM
Total PCBs	280	33		µg/Kg	1	5/23/2014 10:59 PM
Surr: Tetrachloro-m-xylene	65.8	44-130		%REC	1	5/23/2014 10:59 PM
Surr: Decachlorobiphenyl	163	60-125	S	%REC	1	5/23/2014 10:59 PM

RTI Laboratories - Analytical Report

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

Client:	Tetra Tech Inc.	**Collection Date:**	5/15/2014 12:33:00 PM
Project:	Commonwealth SA		
Lab ID:	1405741-005	**Matrix:**	Liquid
Client Sample ID:	CW-FL-02-051514		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Polychlorinated Biphenyls		**Method: SW8082A**		**SW3550C**		**Analyst: MB**
Aroclor 1016	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1221	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1232	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1242	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1248	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1254	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1260	91	33		µg/Kg	1	5/23/2014 11:23 PM
Aroclor 1262	ND	33		µg/Kg	1	5/23/2014 11:23 PM
Total PCBs	91	33		µg/Kg	1	5/23/2014 11:23 PM
Surr: Tetrachloro-m-xylene	55.1	44-130		%REC	1	5/23/2014 11:23 PM
Surr: Decachlorobiphenyl	144	60-125	S	%REC	1	5/23/2014 11:23 PM

RTI Laboratories - DATES REPORT

WO#: 1405741

Date Reported: 6/2/2014

Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405741-001A	CW-AR-01-051514	5/15/2014 12:30 PM	Liquid				
				SW_1010-Ignitability	5/21/2014 10:00 AM	5/27/2014 9:00 AM	5/27/2014 9:00 AM
				SW_8270A-Semi-Volatile Organic Compounds	5/21/2014 10:00 AM	5/23/2014 9:01 AM	5/28/2014 12:41 PM
				SW_9045-Solid pH Measured in Water at Reported Temperature	5/21/2014 10:00 AM	5/21/2014 8:00 AM	5/21/2014 8:00 AM
				SW_8260A-Volatile Organic Compounds	5/21/2014 10:00 AM	5/21/2014 10:00 AM	5/22/2014 7:23 PM
				SW_8260A-Volatile Organic Compounds	5/21/2014 10:00 AM	5/21/2014 10:00 AM	5/23/2014 2:54 PM
				SW_8260A-Volatile Organic Compounds	5/21/2014 10:00 AM	5/21/2014 10:00 AM	5/27/2014 6:52 PM
1405741-002A	CW-AR-02-051514	5/15/2014 12:45 PM	Liquid				
				SW_1010-Ignitability	5/21/2014 10:00 AM	5/27/2014 9:00 AM	5/27/2014 9:00 AM
				SW_8270A-Semi-Volatile Organic Compounds	5/21/2014 10:00 AM	5/23/2014 9:01 AM	5/28/2014 1:08 PM
				SW_9045-Solid pH Measured in Water at Reported Temperature	5/21/2014 10:00 AM	5/21/2014 8:00 AM	5/21/2014 8:00 AM
				SW_8260A-Volatile Organic Compounds	5/21/2014 10:00 AM	5/21/2014 10:00 AM	5/22/2014 1:29 PM
1405741-003A	CW-AR-03-051514	5/15/2014 12:55 PM	Liquid				
				SW_1010-Ignitability	5/20/2014 2:00 PM	5/27/2014 9:00 AM	5/27/2014 9:00 AM
				SW_7470A-Mercury	5/20/2014 2:00 PM	5/21/2014 11:21 AM	5/22/2014 8:22 AM
				SW_6010A-Metals, ICP/OES	5/20/2014 2:00 PM	5/21/2014 8:51 AM	5/22/2014 10:24 AM
				SW_8082O-Polychlorinated Biphenyls	5/20/2014 2:00 PM	5/23/2014 10:26 AM	5/23/2014 1:02 PM
1405741-004A	CW-FL-01-051514	5/15/2014 12:30 PM	Liquid				
				SW_8082S-Polychlorinated Biphenyls		5/23/2014 8:41 AM	5/23/2014 10:59 PM
1405741-005A	CW-FL-02-051514	5/15/2014 12:33 PM	Liquid				
				SW_8082S-Polychlorinated Biphenyls		5/23/2014 8:41 AM	5/23/2014 11:23 PM

RTI Laboratories - QC SUMMARY REPORT

WO#: 1405741

Date Reported: 6/2/2014

Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA

Batch ID: 33179

Sample ID: **1405661-001AMS** Samp Type: **MS** Test Code: **SW_6010A** Units: **µg/L** Prep Date: **5/21/2014** RunNo: **67671**

Client ID: **ZZZZZZ** Batch ID: **33179** TestNo: **SW6010B** **SW3020A** Analysis Date: **5/22/2014** SeqNo: **1317746**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Arsenic	570	40	500.0	19.14	110	87	113				
Barium	16,000	200	500.0	15,940	57.9	88	113				ES
Cadmium	520	5.0	500.0	1.851	103	88	113				
Chromium	530	10	500.0	2.290	106	90	113				
Lead	520	100	500.0	6.698	102	86	113				
Selenium	560	40	500.0	0	113	83	114				
Silver	580	20	500.0	0.9114	117	84	115				S

Sample ID: **1405661-001AMSD** Samp Type: **MSD** Test Code: **SW_6010A** Units: **µg/L** Prep Date: **5/21/2014** RunNo: **67671**

Client ID: **ZZZZZZ** Batch ID: **33179** TestNo: **SW6010B** **SW3020A** Analysis Date: **5/22/2014** SeqNo: **1317747**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Arsenic	580	40	500.0	19.14	112	87	113	567.6	1.63	20	
Barium	16,000	200	500.0	15,940	0.926	88	113	16,230	1.77	20	ES
Cadmium	510	5.0	500.0	1.851	101	88	113	518.2	2.50	20	
Chromium	520	10	500.0	2.290	104	90	113	533.3	1.91	20	
Lead	510	100	500.0	6.698	101	86	113	515.2	0.492	20	
Selenium	610	40	500.0	0	123	83	114	562.6	8.73	20	S
Silver	570	20	500.0	0.9114	113	84	115	584.5	2.84	20	

Sample ID: **MB-33179** Samp Type: **MBLK** Test Code: **SW_6010A** Units: **µg/L** Prep Date: **5/21/2014** RunNo: **67671**

Client ID: **PBW** Batch ID: **33179** TestNo: **SW6010B** **SW3020A** Analysis Date: **5/22/2014** SeqNo: **1317803**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Arsenic	17	40									J
Barium	21	200									J
Cadmium	0.33	5.0									J
Chromium	1.3	10									J
Lead	ND	100									
Selenium	ND	40									
Silver	0.61	20									J

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **33179**

Sample ID: **LCS-33179** Samp Type: **LCS** Test Code: **SW_6010A** Units: **µg/L** Prep Date: **5/21/2014** RunNo: **67671**

Client ID: **LCSW** Batch ID: **33179** TestNo: **SW6010B** **SW3020A** Analysis Date: **5/22/2014** SeqNo: **1317804**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Arsenic	540	40	500.0	0	109	87	113				
Barium	530	200	500.0	0	106	88	113				
Cadmium	530	5.0	500.0	0	105	88	113				
Chromium	520	10	500.0	0	104	90	113				
Lead	510	100	500.0	0	102	86	113				
Selenium	460	40	500.0	0	91.2	83	114				
Silver	560	20	500.0	0	112	84	115				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **33188**

Sample ID:	**MB-33188**	Samp Type:	**MBLK**	Test Code:	**SW_7470A**	Units:	**µg/L**	Prep Date:		**5/21/2014**	RunNo:		**67643**
Client ID:	**PBW**	Batch ID:	**33188**	TestNo:	**SW7470A**	**SW7470**		Analysis Date:		**5/22/2014**	SeqNo:		**1317514**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID:	**LCS-33188**	Samp Type:	**LCS**	Test Code:	**SW_7470A**	Units:	**µg/L**	Prep Date:		**5/21/2014**	RunNo:		**67643**
Client ID:	**LCSW**	Batch ID:	**33188**	TestNo:	**SW7470A**	**SW7470**		Analysis Date:		**5/22/2014**	SeqNo:		**1317515**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Mercury	1.0	0.20	1.000	0	104	82	119				

Sample ID:	**1405660-001AMS**	Samp Type:	**MS**	Test Code:	**SW_7470A**	Units:	**µg/L**	Prep Date:		**5/21/2014**	RunNo:		**67643**
Client ID:	**ZZZZZZ**	Batch ID:	**33188**	TestNo:	**SW7470A**	**SW7470**		Analysis Date:		**5/22/2014**	SeqNo:		**1317517**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Mercury	0.96	0.20	1.000	0	96.5	82	119				

Sample ID:	**1405660-001AMSD**	Samp Type:	**MSD**	Test Code:	**SW_7470A**	Units:	**µg/L**	Prep Date:		**5/21/2014**	RunNo:		**67643**
Client ID:	**ZZZZZZ**	Batch ID:	**33188**	TestNo:	**SW7470A**	**SW7470**		Analysis Date:		**5/22/2014**	SeqNo:		**1317518**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Mercury	0.98	0.20	1.000	0	98.1	82	119	0.9650	1.64	20	

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **33213**

Sample ID: **1405488-001CMS** Samp Type: **MS** Test Code: **SW_8082S** Units: **µg/Kg-dry** Prep Date: **5/23/2014** RunNo: **67740**

Client ID: **ZZZZZZ** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1319112**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	180	39	195.6	0	92.2	46	129				
Aroclor 1260	170	39	195.6	0	86.8	45	134				
Surr: Tetrachloro-m-xylene	8.9		9.781		91.5	44	130				
Surr: Decachlorobiphenyl	9.2		9.781		93.6	40	135				

Sample ID: **1405488-001CMSD** Samp Type: **MSD** Test Code: **SW_8082S** Units: **µg/Kg-dry** Prep Date: **5/23/2014** RunNo: **67740**

Client ID: **ZZZZZZ** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1319113**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	190	39	197.6	0	95.8	46	129	180.3	4.87	25	
Aroclor 1260	180	39	197.6	0	90.9	45	134	169.8	5.59	25	

Sample ID: **LCS-33213** Samp Type: **LCS** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67740**

Client ID: **LCSS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1319130**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	9.1		9.878		92.6	44	130		0	25	
Surr: Decachlorobiphenyl	9.6		9.878		97.7	40	135		0	25	
Aroclor 1016	130	33	166.1	0	78.2	46	129				

Sample ID: **MB-33213** Samp Type: **MBLK** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67740**

Client ID: **PBS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1319131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1260	130	33	166.1	0	80.5	45	134				
Surr: Tetrachloro-m-xylene	6.6		8.303		78.9	44	130				
Surr: Decachlorobiphenyl	6.8		8.303		81.9	40	135				
Aroclor 1016	ND	33									
Aroclor 1221	ND	33									
Aroclor 1232	ND	33									
Aroclor 1242	ND	33									
Aroclor 1248	ND	33									

Date Reported: 6/2/2014
Revision v1

Sample ID: **MB-33213** Samp Type: **MBLK** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67740**
Client ID: **PBS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1319131**

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **33213**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1254	ND	33									
Aroclor 1260	ND	33									
Aroclor 1262	ND	33									
Total PCBs	ND	33									
Surr: Tetrachloro-m-xylene	7.4		8.237		90.2	44	130				
Surr: Decachlorobiphenyl	7.9		8.237		96.1	60	125				

Sample ID: **1405488-001CMS** Samp Type: **MS** Test Code: **SW_8082S** Units: **µg/Kg-dry** Prep Date: **5/23/2014** RunNo: **67741**
Client ID: **ZZZZZZ** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1320604**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	180	39	195.6	0	94.1	46	129				
Aroclor 1260	200	39	195.6	0	104	45	134				
Surr: Tetrachloro-m-xylene	10		9.781		103	44	130				
Surr: Decachlorobiphenyl	11		9.781		116	40	135				

Sample ID: **1405488-001CMSD** Samp Type: **MSD** Test Code: **SW_8082S** Units: **µg/Kg-dry** Prep Date: **5/23/2014** RunNo: **67741**
Client ID: **ZZZZZZ** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1320605**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual

Sample ID: **LCS-33213** Samp Type: **LCS** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67741**
Client ID: **LCSS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1320617**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	190	39	197.6	0	97.0	46	129	180.3	6.15	25	
Aroclor 1260	220	39	197.6	0	113	45	134	169.8	26.8	25	R
Surr: Tetrachloro-m-xylene	10		9.878		106	44	130		0	25	
Surr: Decachlorobiphenyl	12		9.878		120	40	135		0	25	
Aroclor 1016	130	33	166.1	0	77.9	46	129				
Aroclor 1260	130	33	166.1	0	78.9	45	134				

Surr: Tetrachloro-m-xylene	7.3	8.303	87.7	44	130	

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** 33213

Sample ID: **LCS-33213** Samp Type: **LCS** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67741**

Client ID: **LCSS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1320617**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	7.0		8.303		84.9	40	135				

Sample ID: **MB-33213** Samp Type: **MBLK** Test Code: **SW_8082S** Units: **µg/Kg** Prep Date: **5/23/2014** RunNo: **67741**

Client ID: **PBS** Batch ID: **33213** TestNo: **SW8082** **SW3550C** Analysis Date: **5/23/2014** SeqNo: **1320618**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	ND	33									
Aroclor 1221	ND	33									
Aroclor 1232	ND	33									
Aroclor 1242	ND	33									
Aroclor 1248	ND	33									
Aroclor 1254	ND	33									
Aroclor 1260	ND	33									
Aroclor 1262	ND	33									
Total PCBs	ND	33									
Surr: Tetrachloro-m-xylene	7.7		8.237		94.0	44	130				
Surr: Decachlorobiphenyl	8.8		8.237		107	60	125				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** 33214

Sample ID: **MB-33214** Samp Type: **MBLK** Test Code: **SW_8270A** Units: **µg/L** Prep Date: **5/23/2014** RunNo: **67810**

Client ID: **PBW** Batch ID: **33214** TestNo: **SW8270C** **SW3510C** Analysis Date: **5/28/2014** SeqNo: **1320445**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
2,4,5-Trichlorophenol	ND	25									
2,4,6-Trichlorophenol	ND	20									
2,4-Dinitrotoluene	ND	25									
2-Methylphenol	ND	25									
3/4 Methylphenol	ND	50									
Hexachlorobenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Hexachloroethane	ND	25									
Nitrobenzene	ND	15									
Pentachlorophenol	ND	25									
Surr: 2,4,6-Tribromophenol	140		125.0		109	43	140				
Surr: 2-Fluorobiphenyl	130		125.0		104	44	119				
Surr: 2-Fluorophenol	110		125.0		89.2	19	119				
Surr: Nitrobenzene-d5	130		125.0		101	44	120				
Surr: Phenol-d5	110		125.0		87.5	30	130				
Surr: Terphenyl-d14	150		125.0		120	50	134				

Sample ID: **LCS-33214** Samp Type: **LCS** Test Code: **SW_8270A** Units: **µg/L** Prep Date: **5/23/2014** RunNo: **67810**

Client ID: **LCSW** Batch ID: **33214** TestNo: **SW8270C** **SW3510C** Analysis Date: **5/28/2014** SeqNo: **1320447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
2,4,5-Trichlorophenol	89	25	100.0	0	89.4	53	123				
2,4,6-Trichlorophenol	89	20	100.0	0	88.6	50	125				
2,4-Dinitrotoluene	110	25	100.0	0	106	57	128				
2-Methylphenol	79	25	100.0	0	79.0	30	117				
3/4 Methylphenol	150	50	200.0	0	76.1	25	120				
Hexachlorobenzene	97	5.0	100.0	0	96.8	53	125				
Hexachlorobutadiene	64	5.0	100.0	0	63.7	22	124				
Hexachloroethane	58	25	100.0	0	58.5	21	115				
Nitrobenzene	78	15	100.0	0	78.2	45	121				
Pentachlorophenol	110	25	100.0	0	112	35	138				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** 33214

Sample ID: **LCS-33214** Samp Type: **LCS** Test Code: **SW_8270A** Units: **µg/L** Prep Date: **5/23/2014** RunNo: **67810**

Client ID: **LCSW** Batch ID: **33214** TestNo: **SW8270C** **SW3510C** Analysis Date: **5/28/2014** SeqNo: **1320447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	140		125.0		110	43	140				
Surr: 2-Fluorobiphenyl	100		125.0		82.0	44	119				
Surr: 2-Fluorophenol	86		125.0		68.8	19	119				
Surr: Nitrobenzene-d5	97		125.0		77.7	44	120				
Surr: Phenol-d5	89		125.0		71.2	30	130				
Surr: Terphenyl-d14	150		125.0		123	50	134				

Sample ID: **LCSD-33214** Samp Type: **LCSD** Test Code: **SW_8270A** Units: **µg/L** Prep Date: **5/23/2014** RunNo: **67810**

Client ID: **LCSS02** Batch ID: **33214** TestNo: **SW8270C** **SW3510C** Analysis Date: **5/28/2014** SeqNo: **1320448**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
2,4,5-Trichlorophenol	120	25	100.0	0	115	53	123	89.45	25.3	25	R
2,4,6-Trichlorophenol	120	20	100.0	0	117	50	125	88.55	27.4	25	R
2,4-Dinitrotoluene	120	25	100.0	0	115	57	128	105.9	8.41	25	
2-Methylphenol	110	25	100.0	0	106	30	117	79.05	29.5	25	R
3/4 Methylphenol	210	50	200.0	0	103	25	120	152.2	30.1	25	R
Hexachlorobenzene	110	5.0	100.0	0	112	53	125	96.80	14.5	25	
Hexachlorobutadiene	87	5.0	100.0	0	86.7	22	124	63.70	30.6	25	R
Hexachloroethane	83	25	100.0	0	83.3	21	115	58.50	35.0	25	R
Nitrobenzene	100	15	100.0	0	105	45	121	78.20	29.3	25	R
Pentachlorophenol	120	25	100.0	0	119	35	138	111.7	6.50	25	
Surr: 2,4,6-Tribromophenol	160		125.0		125	43	140		0	25	
Surr: 2-Fluorobiphenyl	140		125.0		108	44	119		0	25	
Surr: 2-Fluorophenol	120		125.0		93.8	19	119		0	25	
Surr: Nitrobenzene-d5	130		125.0		107	44	120		0	25	
Surr: Phenol-d5	120		125.0		95.7	30	130		0	25	
Surr: Terphenyl-d14	150		125.0		121	50	134		0	25	

RTI Laboratories - QC SUMMARY REPORT

WO#: 1405741

Date Reported: 6/2/2014

Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** 33218

Sample ID: **1405789-001AMS** Samp Type: **MS** Test Code: **SW_8082O** Units: **mg/Kg** Prep Date: **5/23/2014** RunNo: **67736**

Client ID: **ZZZZZZ** Batch ID: **33218** TestNo: **SW8082** Analysis Date: **5/23/2014** SeqNo: **1319019**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	7.4	0.91	9.091	0	81.5	70	130				
Aroclor 1260	7.9	0.91	9.091	0	86.5	70	130				
Surr: Tetrachloro-m-xylene	0.42		0.4545		91.4	41.1	138				
Surr: Decachlorobiphenyl	0.48		0.4545		107	36.1	139				

Sample ID: **1405789-001AMSD** Samp Type: **MSD** Test Code: **SW_8082O** Units: **mg/Kg** Prep Date: **5/23/2014** RunNo: **67736**

Client ID: **ZZZZZZ** Batch ID: **33218** TestNo: **SW8082** Analysis Date: **5/23/2014** SeqNo: **1319020**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	8.1	0.93	9.259	0	87.0	70	130	7.410	8.31	25	
Aroclor 1260	8.1	0.93	9.259	0	87.9	70	130	7.862	3.41	25	
Surr: Tetrachloro-m-xylene	0.43		0.4630		93.3	41.1	138		0	25	
Surr: Decachlorobiphenyl	0.49		0.4630		107	36.1	139		0	25	

Sample ID: **LCS-33218** Samp Type: **LCS** Test Code: **SW_8082O** Units: **mg/Kg** Prep Date: **5/23/2014** RunNo: **67736**

Client ID: **LCSW** Batch ID: **33218** TestNo: **SW8082** Analysis Date: **5/23/2014** SeqNo: **1319024**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	10	1.0	10.00	0	103	70	130				
Aroclor 1260	11	1.0	10.00	0	112	70	130				
Surr: Tetrachloro-m-xylene	0.48		0.5000		95.3	70	130				
Surr: Decachlorobiphenyl	0.59		0.5000		117	70	130				

Sample ID: **MB-33218** Samp Type: **MBLK** Test Code: **SW_8082O** Units: **mg/Kg** Prep Date: **5/23/2014** RunNo: **67736**

Client ID: **PBW** Batch ID: **33218** TestNo: **SW8082** Analysis Date: **5/23/2014** SeqNo: **1319025**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1016	ND	1.0									
Aroclor 1221	ND	1.0									
Aroclor 1232	ND	1.0									
Aroclor 1242	ND	1.0									
Aroclor 1248	ND	1.0									

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **33218**

Sample ID: **MB-33218** Samp Type: **MBLK** Test Code: **SW_8082O** Units: **mg/Kg** Prep Date: **5/23/2014** RunNo: **67736**

Client ID: **PBW** Batch ID: **33218** TestNo: **SW8082** Analysis Date: **5/23/2014** SeqNo: **1319025**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Aroclor 1254	ND	1.0									
Aroclor 1260	ND	1.0									
Aroclor 1262	ND	1.0									
Total PCBs	ND	1.0									
Surr: Tetrachloro-m-xylene	0.48		0.5000		95.8	70	130				
Surr: Decachlorobiphenyl	0.56		0.5000		112	70	130				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **R67695**

Sample ID: **VOA11B LCS 05221** Samp Type: **LCS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **LCSW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318139**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	9.5	1.0	10.00	0	94.7	71	131				
1,2-Dichloroethane	9.1	1.0	10.00	0	90.6	73	128				
1,4-Dichlorobenzene	9.4	1.0	10.00	0	94.3	79	118				
Benzene	10	1.0	10.00	0	104	79	120				
Carbon tetrachloride	9.0	1.0	10.00	0	90.2	72	136				
Chlorobenzene	9.9	1.0	10.00	0	99.1	82	118				
Chloroform	9.6	1.0	10.00	0	96.5	79	124				
Methyl ethyl ketone	10	10	10.00	0	101	56	143				
Tetrachloroethene	9.3	1.0	10.00	0	93.2	74	129				
Trichloroethene	9.8	1.0	10.00	0	98.4	79	123				
Vinyl chloride	9.3	1.0	10.00	0	93.0	58	137				
Surr: 4-Bromofluorobenzene	63		60.00		105	85	114				
Surr: Dibromofluoromethane	62		60.00		103	80	119				
Surr: Toluene-d8	64		60.00		107	89	112				

Sample ID: **VOA11B TCLP LCS** Samp Type: **LCS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **LCSW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	9.6	1.0	10.00	0	95.8	71	131				
1,2-Dichloroethane	9.0	1.0	10.00	0	90.5	73	128				
1,4-Dichlorobenzene	10	1.0	10.00	0	100	79	118				
Benzene	11	1.0	10.00	0	105	79	120				
Carbon tetrachloride	9.0	1.0	10.00	0	90.2	72	136				
Chlorobenzene	10	1.0	10.00	0	101	82	118				
Chloroform	9.7	1.0	10.00	0	97.1	79	124				
Methyl ethyl ketone	9.9	10	10.00	0	99.4	56	143				J
Tetrachloroethene	10	1.0	10.00	0	100	74	129				
Trichloroethene	9.9	1.0	10.00	0	98.8	79	123				
Vinyl chloride	8.7	1.0	10.00	0	87.1	58	137				
Surr: 4-Bromofluorobenzene	63		60.00		104	85	114				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** R67695

Sample ID: **VOA11B TCLP LCS** Samp Type: **LCS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**
Client ID: **LCSW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	61		60.00		102	80	119				
Surr: Toluene-d8	65		60.00		108	89	112				

Sample ID: **VOA11B MBLK 0522** Samp Type: **MBLK** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**
Client ID: **PBW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	ND	1.0									
1,2-Dichloroethane	ND	1.0									
1,4-Dichlorobenzene	ND	1.0									
Benzene	ND	1.0									
Carbon tetrachloride	ND	1.0									
Chlorobenzene	0.24	1.0									J
Chloroform	ND	1.0									
Methyl ethyl ketone	ND	10									
Tetrachloroethene	ND	1.0									
Trichloroethene	ND	1.0									
Vinyl chloride	ND	1.0									
Surr: 4-Bromofluorobenzene	51		50.00		102	85	114				
Surr: Dibromofluoromethane	55		50.00		111	80	119				
Surr: Toluene-d8	54		50.00		108	89	112				

Sample ID: **VOA11B TCLP MBLK** Samp Type: **MBLK** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**
Client ID: **PBW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	ND	1.0									
1,2-Dichloroethane	ND	1.0									
1,4-Dichlorobenzene	ND	1.0									
Benzene	ND	1.0									
Carbon tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **R67695**

Sample ID: **VOA11B TCLP MBLK** Samp Type: **MBLK** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **PBW** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Chloroform	ND	1.0									
Methyl ethyl ketone	ND	10									
Tetrachloroethene	ND	1.0									
Trichloroethene	ND	1.0									
Vinyl chloride	ND	1.0									
Surr: 4-Bromofluorobenzene	52		50.00		104	85	114				
Surr: Dibromofluoromethane	55		50.00		110	80	119				
Surr: Toluene-d8	55		50.00		110	89	112				

Sample ID: **1405745-004AMS** Samp Type: **MS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **ZZZZZZ** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318145**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	240	25	250.0	0	95.1	71	131				
1,2-Dichloroethane	230	25	250.0	0	91.8	73	128				
1,4-Dichlorobenzene	240	25	250.0	0	96.4	79	118				
Benzene	270	25	250.0	0	106	79	120				
Carbon tetrachloride	220	25	250.0	0	89.0	72	136				
Chlorobenzene	250	25	250.0	0	99.9	82	118				
Chloroform	250	25	250.0	0	98.1	79	124				
Methyl ethyl ketone	230	250	250.0	0	92.5	56	143				J
Tetrachloroethene	2,800	25	250.0	4,096	-520	74	129				S
Trichloroethene	290	25	250.0	64.25	90.7	79	123				
Vinyl chloride	240	25	250.0	0	94.2	58	137				
Surr: 4-Bromofluorobenzene	1,600		1,500		104	85	114				
Surr: Dibromofluoromethane	1,500		1,500		103	80	119				
Surr: Toluene-d8	1,600		1,500		109	89	112				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** R67695

Sample ID: **1405745-004AMSD** Samp Type: **MSD** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **ZZZZZZ** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318146**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	230	25	250.0	0	92.1	71	131	237.8	3.21	25	
1,2-Dichloroethane	220	25	250.0	0	89.1	73	128	229.5	2.99	25	
1,4-Dichlorobenzene	230	25	250.0	0	92.0	79	118	241.0	4.67	25	
Benzene	250	25	250.0	0	101	79	120	265.5	5.52	25	
Carbon tetrachloride	210	25	250.0	0	83.9	72	136	222.5	5.90	25	
Chlorobenzene	240	25	250.0	0	95.2	82	118	249.8	4.82	25	
Chloroform	240	25	250.0	0	95.5	79	124	245.2	2.69	25	
Methyl ethyl ketone	250	250	250.0	0	99.9	56	143	231.2	7.69	25	J
Tetrachloroethene	2,600	25	250.0	4,096	-608	74	129	2,796	8.18	25	S
Trichloroethene	270	25	250.0	64.25	83.8	79	123	291.0	6.11	25	
Vinyl chloride	210	25	250.0	0	84.4	58	137	235.5	11.0	25	
Surr: 4-Bromofluorobenzene	1,600		1,500		105	85	114		0	25	
Surr: Dibromofluoromethane	1,500		1,500		103	80	119		0	25	
Surr: Toluene-d8	1,600		1,500		107	89	112		0	25	

Sample ID: **1405661-001AMS** Samp Type: **MS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **ZZZZZZ** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318150**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	2,000	200	2,000	0	101	71	131				
1,2-Dichloroethane	1,900	200	2,000	0	96.9	73	128				
1,4-Dichlorobenzene	1,900	200	2,000	0	96.9	79	118				
Benzene	2,200	200	2,000	0	110	79	120				
Carbon tetrachloride	1,800	200	2,000	0	89.9	72	136				
Chlorobenzene	2,000	200	2,000	0	102	82	118				
Chloroform	2,100	200	2,000	0	104	79	124				
Methyl ethyl ketone	2,700	2,000	2,000	556.0	107	56	143				
Tetrachloroethene	2,000	200	2,000	0	99.9	74	129				
Trichloroethene	1,900	200	2,000	0	97.3	79	123				
Vinyl chloride	1,900	200	2,000	0	95.2	58	137				
Surr: 4-Bromofluorobenzene	13,000		12,000		106	85	114				

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **R67695**

Sample ID: **1405661-001AMS** Samp Type: **MS** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **ZZZZZZ** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318150**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	12,000		12,000		104	80	119				
Surr: Toluene-d8	13,000		12,000		111	89	112				

Sample ID: **1405661-001AMSD** Samp Type: **MSD** Test Code: **SW_8260A** Units: **µg/L** Prep Date: **5/22/2014** RunNo: **67695**

Client ID: **ZZZZZZ** Batch ID: **R67695** TestNo: **SW8260B** Analysis Date: **5/22/2014** SeqNo: **1318151**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1,1-Dichloroethene	2,000	200	2,000	0	98.4	71	131	2,014	2.31	25	
1,2-Dichloroethane	1,900	200	2,000	0	94.4	73	128	1,938	2.61	25	
1,4-Dichlorobenzene	1,900	200	2,000	0	95.3	79	118	1,938	1.66	25	
Benzene	2,100	200	2,000	0	107	79	120	2,208	2.85	25	
Carbon tetrachloride	1,800	200	2,000	0	90.8	72	136	1,798	0.996	25	
Chlorobenzene	1,900	200	2,000	0	97.2	82	118	2,044	5.02	25	
Chloroform	2,000	200	2,000	0	99.3	79	124	2,076	4.43	25	
Methyl ethyl ketone	2,600	2,000	2,000	556.0	101	56	143	2,698	4.86	25	
Tetrachloroethene	2,000	200	2,000	0	99.1	74	129	1,998	0.804	25	
Trichloroethene	2,000	200	2,000	0	97.5	79	123	1,946	0.205	25	
Vinyl chloride	1,800	200	2,000	0	88.9	58	137	1,904	6.84	25	
Surr: 4-Bromofluorobenzene	13,000		12,000		105	85	114		0	25	
Surr: Dibromofluoromethane	13,000		12,000		105	80	119		0	25	
Surr: Toluene-d8	13,000		12,000		109	89	112		0	25	

Date Reported: 6/2/2014
Revision v1

Client: Tetra Tech Inc.

Project: Commonwealth SA **Batch ID:** **R67760**

Sample ID:	**LCS-R67760**	Samp Type: **LCS**		Test Code:	**SW_1010**	Units:	**°F**	Prep Date:	**5/27/2014**	RunNo:	**67760**
Client ID:	**LCSS**	Batch ID:	**R67760**	TestNo:	**SW1010**			Analysis Date:	**5/27/2014**	SeqNo:	**1319431**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Ignitability	81	70	81.00	0	100	90	110				

RTI Laboratories - Definitions and Acronyms

WO#: 1405741

Date Reported: 6/2/2014
Revision v1

DEFINITIONS:

DF: Dilution factor; the dilution factor applied to the prepared sample.

DUP: Duplicate; aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently, used to calculate Precision (%RPD).

LCS: Laboratory Control Sample; prepared by adding a known amount of target analytes to a specified amount of clean matrix and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: A duplicate LCS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that does not contain target analytes or interference that may impact the analytical results and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, used to assess and verify that the analytical process is free of contamination.

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) – milligram per Kilogram (W/W) or milligram per Liter (W/V).

MS: Matrix Spike; prepared by adding a known amount of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: A duplicate MS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

% REC: Percent Recovery of a known spike (SPK); a measure of accuracy expressed as a percentage of a measured (recovered) concentration compared to the known concentration (SPK) added to the sample. This is compared to the Low Limit and High Limit.

% RPD: Relative Percent Difference; a measure of precision expressed as a percentage of the difference between two duplicates relative to the average concentration. This is compared to the RPD Limit.

PL: Permit limit:; Not included on all reports. Used primarily for wastewater discharge permits.

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a “J” qualifier.

Qual: Qualifier that applies to the analyte reported

RL: Reporting Limit: See PQL

SPK: Spike; used in the QC section for both SPK Value and SPK Ref Val

Ug/Kg or ug/L: Units of part per billion (PPB) – microgram per Kilogram (W/W) or microgram per Liter (W/V).

QUALIFIERS:

*/X: Reported value exceeds the maximum allowed concentration by regulation or permit

B: Analyte detected in the associated Method Blank at a concentration > RL.

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be considered estimated.

H: Holding time for preparation or analysis has been exceeded

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts.

M: Manual Integration used to determine area response

ND: Not detected at the Reporting Limit

P: Second column RPD exceeds 40%

R: % RPD exceeds control limits

S: % REC exceeds control limits

T: MBLK result is greater than 1/2 of the LOQ

U: The analyte concentration is less than the DL.

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2	CW-AR-02-051514	05-15-14	1245			/	16oz	Waste Liquid	2	X			VOC's (..crcvtok. 4 cAuv;
3	CW-AR-03-051514	05-15-14	1255			/	16	lateim.4.4"	2		X		
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